



Influence of outlet geometry on the swirling flow in a simplified model of a large two-stroke marine diesel engine

Haider, Sajjad; Schnipper, Teis; Meyer, Knud Erik; Walther, Jens Honore; Mayer, S.

Publication date:
2011

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Haider, S., Schnipper, T., Meyer, K. E., Walther, J. H., & Mayer, S. (2011). *Influence of outlet geometry on the swirling flow in a simplified model of a large two-stroke marine diesel engine*. Abstract from The 64th Annual Meeting of the American Physical Society's Division of Fluid Dynamics (DFD), Baltimore, Md., USA.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Influence of outlet geometry on the swirling flow in a simplified model of a large two-stroke marine diesel engine S. HAIDER, T. SCHNIPPER, K.E. MEYER, J.H. WALTHER, Department of Mechanical Engineering, Technical University of Denmark, S. MAYER, MAN Diesel & Turbo, Denmark — We present Stereoscopic particle image velocimetry measurements of the effect of a dummy-valve on the in-cylinder swirling flow in a simplified scale model of a large two-stroke marine diesel engine cylinder using air at room temperature and pressure as the working fluid and Reynolds number 19500. The static model has stroke-to-bore ratio of 4, is rotationally symmetric and the in-cylinder swirling flow is enforced by angled ports at the inlet. We consider a case analogous to engine when the piston is at bottom-dead-center. In absence of an exhaust valve the overall axial velocity profile is wake-like and flow reversal is observed on the cylinder axis, close to the inlet. Downstream, the flow reversal disappears and instead a localized jet develops. The corresponding tangential velocity profiles show a concentrated vortex with decreasing width along the downstream direction. By placing a concentric dummy-valve at the cylinder outlet, the magnitude of reverse flow at the inlet increases, the strong swirl is diminished and the axial jet disappears. We compare these findings with previous measurements in vortex chambers and discuss the relevance of these results with respect to development of marine engines.

S. Haider
Department of Mechanical Engineering, Technical University of Denmark

Date submitted: 10 Aug 2011

Electronic form version 1.4